WHAT IS CLAIMED IS:

1. A method for measuring the lifetime of an excited state in a specimen, coprises the following steps:
   - generating an exciting light pulse and an emitting light pulse;
   - illuminating the specimen with the exciting light pulse;
   - illuminating the specimen with the emitting light pulse at a predefined time offset from illuminating the specimen with the exciting light pulse;
   - detecting the power level of the luminescent light emerging from the specimen;
   - repeating the first four steps with different time offsets; and
   - determining the lifetime of the excited state of the specimen as a function of the power level of the luminescent light emerging from the specimen and the time offset.

2. The method as defined in Claim 1, wherein the exciting light pulse is generated with a pulsed laser, and the emitting light pulse with a further pulsed laser and both pulsed lasers are synchronized with one another.

3. The method as defined in Claim 1, wherein the exciting light pulse and the emitting light pulse are generated by a single pulsed laser.

4. The method as defined in Claim 1, comprises one further step:
   - reducing the energy of the emitting light pulse in proportion to the energy of the exciting light pulse.

5. The method as defined in Claim 4, wherein this is achieved with an optically parametric oscillator that is provided in the beam path of the emitting light pulse.

6. The method as defined in Claim 1, wherein the luminescent light is fluorescent light.

7. The method as defined in Claim 1, wherein the specimen is a microscopic sample equipped with fluorescent dyes.

8. The method as defined in Claim 1, wherein light of the wavelength of the emitting light pulse is not detected.

9. An apparatus for measuring the lifetime of an excited state in a specimen, wherein the apparatus comprises an electromagnetic energy source that emits light of one wavelength, a means for dividing the light into at least a first and a second partial light beam and an intermediate element in at least one partial light beam to influence the time of travel of the at least one partial light beam.

10. The apparatus as defined in Claim 9, wherein the first partial light beam is an exciting light beam directed onto a specimen, and excites a defined subregion there.

11. The apparatus as defined in Claim 10, wherein the second partial light beam defines an emitting light beam and is directed onto the specimen in such a way that the subregion of the specimen is at least partially overlapped.

12. The apparatus as defined in Claim 9, wherein the intermediate element modifies the length of the optical light path.

13. The apparatus as defined in Claim 12 wherein the intermediate element is configured movably and thereby defines a chicane having an adjustable passage length.

14. The apparatus as defined in Claim 9, wherein an element for wavelength modification is provided in one partial light beam.

15. The apparatus as defined in Claim 14, wherein the element for wavelength modification is an optically parametric oscillator or an element for frequency multiplication.

16. The apparatus as defined in Claim 10, wherein the excitation is multi-photon excitation.

17. The apparatus as defined in Claim 9, wherein the electromagnetic energy source is a laser.

18. The apparatus as defined in Claim 19, wherein the electromagnetic energy source is a pulsed laser.

19. A scanning microscope comprising a device for generating a relative motion between an illuminating light beam and a specimen, a microscope optical system, a detector and an apparatus for measuring the lifetime of an excited state in a specimen.

20. The scanning microscope as defined in claim 19 wherein the apparatus for measuring the lifetime of an excited state in a specimen has an electromagnetic energy source that emits light of one wavelength, a means for dividing the light into at least a first and a second partial light beam and an intermediate element in at least one partial light beam to influence the time of travel of the at least one partial light beam.